

CLAIMS

1. A fastener installation apparatus, comprising:
 - a fixed member;
 - a plunger assembly having two spaced generally parallel projecting
 - 5 end portions adapted to be fixed relative to said fixed member;
 - a moveable member resiliently biased away from said fixed member
 - having two spaced parallel feed passages each simultaneously receiving a fastener to
 - be installed by said fastener installation apparatus and each communicating with a
 - generally transverse plunger passage aligned with one of said projecting end portions
 - 10 of said plunger assembly, whereby two fasteners are simultaneously installed by said
 - fastener installation apparatus upon movement of said moveable member toward said
 - fixed member, thereby receiving said projecting end portions of said plunger
 - assembly through said plunger passages.
2. The fastener installation apparatus as defined in Claim 1, wherein said
- 15 plunger assembly is integral and generally C-shaped having a body portion fixed
- relative to said fixed member and integral generally parallel projecting leg portions.
3. The fastener installation apparatus as defined in Claim 1, wherein said
- plunger assembly comprises two separate parallel plungers, each plunger including a
- body portion fixed relative to said fixed member.
- 20 4. The fastener installation apparatus as defined in Claim 3, wherein said
- body portion of each of said plungers is received through an opening in said fixed
- member configured to receive said body portion.

5. The fastener installation apparatus as defined in Claim 4, wherein said body portion of each of said plungers is cylindrical and said openings in said fastener member are cylindrical, permitting rotation of said plungers relative to said fixed member.

5 6. The fastener installation apparatus as defined in Claim 1, wherein said fastener installation apparatus includes two sensors, one sensor adjacent each plunger passage, said sensors indicating a presence of a fastener in each plunger passage, actuating said fastener installation apparatus only when a fastener is located in each plunger passage.

10 7. The fastener installation apparatus as defined in Claim 6, wherein said sensors are proximity probes, each having an end portion adjacent to, but spaced from said plunger passage, whereby said fasteners do not contact a proximity probe.

8. The fastener installation apparatus as defined in Claim 7, wherein said proximity probes are elongated, each having a longitudinal axis extending generally
15 perpendicular to said feed passages and said plunger passages and each having an end portion adjacent to, but spaced from one of said plunger passages.

9. The fastener installation apparatus as defined in Claim 8, wherein each of said proximity probes are connected by a line to a control, each line extending from said fastener installation apparatus generally perpendicular to said plunger passages.

20 10. The fastener installation apparatus as defined in Claim 6, wherein said fastener installation apparatus includes a plate having a surface opposite said feed passages defining one surface of said plunger passages and said fastener adapted to engage said plate upon receipt through said feed passages into said plunger passages.

11. The fastener installation apparatus as defined in Claim 1, wherein said moveable member is comprised of two opposed mating moveable members and said feed passages are defined between said opposed mating moveable members.

12. The fastener installation apparatus as defined in Claim 1, wherein said
5 plunger is releasably attached to said fixed member.

13. The fastener installation apparatus as defined in Claim 1, wherein said plunger assembly comprises at least two separate plungers, each plunger including a rectangular projecting leg and a cylindrical body portion closely received in a cylindrical opening in said fixed member, whereby said plungers may be rotated
10 relative to said fixed member.

14. A fastener installation apparatus, comprising:
a fixed member;
a plunger assembly fixed relative to said fixed member having a plurality of spaced generally parallel projecting legs, each leg having a free end;
15 a moveable member spring biased away from said fixed member having a plurality of spaced generally parallel feed passages, each feed passage simultaneously receiving a fastener for installation by said fastener installation apparatus and each feed passage communicating with a plunger passage aligned with one of said projecting legs of said plunger assembly, whereby movement of said
20 moveable member toward said fixed member drives said plurality of spaced projecting legs of said plunger assembly through said plunger passages, simultaneously installing a plurality of fasteners located in said plunger passages in a panel located opposite said plunger passages.

15. The fastener installation apparatus as defined in Claim 14, wherein said fastener installation apparatus includes a plurality of sensors, one sensor located adjacent each plunger passage, said sensors indicating a presence of a fastener in each plunger passage, actuating said fastener installation apparatus only when a fastener is
5 located in each plunger passage.

16. The fastener installation apparatus as defined in Claim 14, wherein said plurality of sensors are proximity probes, each proximity probe having an end portion adjacent to, but spaced from one of said plunger passages, whereby said fasteners do not contact a proximity probe upon receipt in said plunger passage.

10 17. The fastener installation apparatus as defined in Claim 16, wherein each said proximity probe is connected by a line to a control extending from said fastener installation apparatus generally perpendicular to said plunger passage.

18. The fastener installation apparatus as defined in Claim 14, wherein said moveable member is comprised of two opposed mating moveable members and
15 said plurality of feed passages are defined between said opposed mating moveable members.

19. The fastener installation apparatus as defined in Claim 14, wherein said plunger assembly includes a body portion and a plurality of spaced generally parallel projecting legs integral with said body portion.

20 20. The fastener installation apparatus as defined in Claim 14, wherein said plunger assembly comprises a plurality of separate parallel plungers, each plunger including a body portion fixed relative to said fixed member and a projecting leg portion.

21. The fastener installation apparatus as defined in Claim 20, wherein said body portion of each of said plungers is received in an opening in said fixed member configured to receive said body portion.

22. The fastener installation apparatus as defined in Claim 21, wherein
5 said body portion of each of said plungers is cylindrical, said openings in said fixed member are cylindrical, permitting rotation of said plungers relative to said fixed member, and said projecting end portions of said plungers are rectangular.

23. A fastener installation apparatus, comprising:
a fixed member;
10 a plunger assembly adapted to be fixed relative to said fixed member including a projecting leg having a free end;
a moveable member spring biased away from said fixed member having a feed passage receiving fasteners for installation by said fastener installation apparatus communicating with a generally transverse plunger passage opposite said
15 projecting leg of said plunger assembly receiving said free end of said plunger through said plunger passage upon movement of said moveable member toward said fixed member to install a fastener in a panel located opposite said plunger passage;
a stop surface opposite said feed passage defining a surface of said plunger passage limiting movement of a fastener from said feed passage into said
20 plunger passage; and
an elongated proximity probe having a longitudinal axis extending generally perpendicular to said plunger passage and said feed passage having an end portion adjacent to, but spaced from said plunger passage, sensing a presence of a fastener in said plunger passage without said fastener contacting said proximity probe.

24. The fastener installation apparatus as defined in Claim 23, wherein said proximity probe is cylindrical having a line connected to a control of said fastener installation apparatus extending from said fastener installation apparatus generally perpendicular to said plunger passage.

5 25. The fastener installation apparatus as defined in Claim 23, wherein said plunger assembly includes a plurality of spaced generally parallel legs, each leg having a free end, said moveable member including a plurality of spaced generally parallel feed passages, each feed passage simultaneously receiving a fastener for installation by said fastener installation apparatus, and each fastener passage
10 communicating with a generally transverse plunger passage receiving one of said plurality of spaced generally parallel legs of said plunger assembly and simultaneously installing a plurality of fasteners in a panel located opposite said plunger passage.

26. The fastener installation apparatus as defined in Claim 25, wherein
15 said plunger assembly includes a body portion and a plurality of spaced generally parallel legs integral with said body portion.

27. The fastener installation apparatus as defined in Claim 25, wherein said plunger assembly includes a plurality of separate parallel plungers, each plunger including a body portion fixed relative to said fixed member.

20 28. The fastener installation apparatus as defined in Claim 27, wherein said body portion of each of said plurality of plungers is received in an opening in said fixed member configured to receive said body portion.

29. The fastener installation apparatus as defined in Claim 23, wherein said moveable member is comprised of two opposed mating moveable members and said plurality of spaced generally parallel feed passages are defined between said opposed mating moveable members.

5 30. The fastener installation apparatus as defined in Claim 23, wherein said fastener installation apparatus includes a shank having a free end connected to said moveable member surrounded by a bushing guiding movement of said moveable member and limiting wear of said shank.

10 31. The fastener installation apparatus as defined in Claim 23, wherein said stop surface is a plate releasably attached to said moveable member.